

## WE CLAIM

1. A fuse apparatus for igniting an explosive charge of a fired ordnance,  
comprising

a laser having a controllable optical power level,

5

an optical switch device having a first position for preventing a laser optical signal from  
impinging on the explosive charge when the fuse apparatus is in a pre-firing state and,  
in response to an arming signal, establishing a second position for unblocking the laser  
optical signal to enable it to impinge the explosive charge,

10

a control unit for determining when the ordnance has been fired, for sending the arming  
signal to the optical switch device, and for increasing the laser power level to a level  
that detonates the explosive charge.

2. The fuse apparatus of claim 1 further comprising

an accelerometer for detecting that the ordnance has been fired, and

5 wherein the control unit is responsive to an accelerometer signal for sending the arming  
signal.

3. The fuse apparatus of claim 1 further comprising

an optical detector for detecting an optical signal from the laser;

5 wherein the optical switch device directs the laser signal to the optical detector during a  
pre-firing state; and

wherein the control unit is responsive to a first signal from the optical detector for verifying that the optical switch device is in the pre-firing state and for setting the laser  
10 optical signal to a low power level and for preventing the firing of the ordnance.

4. The fuse apparatus of claim 1 further comprising
- 5 a position sensor to detect the position of the optical switch;

wherein the control unit is responsive to a signal from the position detector for verifying that the optical switch device is in the pre-firing state in order to confirm a safe switch position prior to firing;

5. The fuse apparatus of claim 1 further comprising an ignitor located in front of the explosive charge and ignited by the higher laser power level thereby causing detonation of the explosive charge.

6. The fuse apparatus of claim 5 where the detonation of the explosive charge is caused either by ignition of the ignitor or by shock wave from the ignitor.

7. The fuse apparatus of claim 5 wherein the ignitor is a RNT foil

8. The fuse apparatus of claim 5 wherein the RNT foil includes a shock wave inducing layer.

9. The fuse apparatus of claim 5 wherein the ignitor is encapsulated in glass envelope.

10. The fuse apparatus of claim 5 wherein a microlens is used to focus the laser optical signal onto the ignitor.

11. The fuse apparatus of claim 1 wherein a microlens is used to focus the laser optical signal onto the explosive charge.

12. The fuse apparatus of claim 1 wherein the control unit receives fire-control programs and/or data from an external source.

13. The fuse apparatus of claim 1 further including

a spin detector for detecting that the ordnance has been fired and

wherein the control unit is responsive to a spin control signal for sending the arming signal.

14. A fuse apparatus for igniting an explosive charge, comprising

a laser having a controllable power level;

5 an optical detector for detecting an optical signal from the laser;

an optical switch device for preventing the laser optical signal from impinging onto the explosive charge and for directing the laser signal to the optical detector during a pre-firing state and, following a predetermined acceleration of the fuse apparatus and an  
10 arming signal, for establishing a fully armed state for enabling the laser optical signal impinge onto the explosive charge;

a position sensor for the optical switch;

15 a control unit

responsive to a first signal from the optical detector and/or from the position sensor for verifying that the optical switch device is in the pre-firing state and for setting the laser optical signal to a low power level and

responsive to an accelerometer signal or to timing information for sending the  
20 arming signal to the optical switch device and for enabling the laser optical signal to  
reach a higher power level; and

wherein when the optical switch device establishes the armed state, the  
increased laser optical power level causes detonation of the explosive charge.